

WHAT IS CLAIMED IS:

1. A pre-drive circuit for a brushless DC single-phase motor having a drive circuit in which a pair of series connected units, each series connected unit being constituted by two switching devices, is connected between a power source and the ground, a motor coil connected between the junctions of the two switching devices of the pair of series connected units can be controllably energized/de-energized from any direction at any timing by controlling the turning ON/OFF of the switching devices, a control voltage exceeding a power supply voltage is required to turn ON the two switching devices adjacent to a power source, and a duty ratio of a turning ON/OFF control voltage applied to the switching devices is changed to control the rotational speed of the motor, the pre-drive circuit comprising:

a step-up circuit for boosting a power supply voltage to a predetermined voltage; a logic circuit for generating and outputting pulse signals for controlling the individual switching devices on the basis of a motor rotational position signal and a duty ratio setting signal for controlling a motor rotational speed;

two switching device drive circuits adjacent to the power source that are respectively connected to pulse signal output terminals for controlling the two switching devices adjacent to the power source of the logic circuit, respectively receive step-up voltages from the step-up circuit as operating power sources, respectively amplify the pulse signals for controlling the two switching devices adjacent to the power source to a predetermined voltage level exceeding the power supply voltage, and respectively supply the amplified pulse signals to control input terminals of the two switching devices adjacent to the power source; and

two switching device drive circuits adjacent to the ground that are respectively connected to the pulse signal output terminals for controlling the two switching devices

adjacent to the ground of the logic circuit, respectively receive voltages that are the power supply voltage or less as operating power sources, respectively amplify the pulse signals for controlling the two switching devices adjacent to the ground as necessary, and supply the amplified pulse signals to the control input terminals of the two switching devices adjacent to the ground.

2. The pre-drive circuit for a brushless DC single-phase motor according to claim 1, wherein

the step-up circuit comprises a potentiometer that allows the step-up voltage to be set by setting a resistance value, and

a desired step-up voltage is obtained by setting the resistance value of the potentiometer on the basis of a control voltage value required for turning ON the two switching devices adjacent to the power source.

3. The pre-drive circuit for a brushless DC single-phase motor according to claim 1, wherein

the switching device drive circuit adjacent to the power source has a resistor and an NPN transistor and a PNP transistor that are connected in series in a forward direction through the intermediary of the resistor, and

the bases of the two transistors are commonly connected to the output terminals of the pulse signals for controlling the switching devices, which are adjacent to the power source, of the logic circuit, while the end of the resistor adjacent to the ground is connected to the control input terminal of the switching device adjacent to the power source.

4. The pre-drive circuit for a brushless DC single-phase motor according to claim 1, wherein

the switching device drive circuit adjacent to the ground has a resistor and an NPN transistor and a PNP transistor that are connected in series in a forward direction through the intermediary of the resistor, and

the bases of the two transistors are commonly connected to the output terminals of the pulse signals for controlling the switching devices, which are adjacent to the ground, of the logic circuit, while the end of the resistor adjacent to the ground is connected to the control input terminal of the switching device adjacent to the ground.

5. The pre-drive circuit for a brushless DC single-phase motor according to claim 1, further comprising:

an overvoltage protection circuit for restraining an overvoltage between the control input terminal of the switching device adjacent to the power source and the switching end, which is adjacent to a motor coil, of a pair of switching ends of the switching device.

6. The pre-drive circuit for a brushless DC single-phase motor according to claim 2, wherein

the switching device drive circuit adjacent to the power source has a resistor and an NPN transistor and a PNP transistor that are connected in series in a forward direction through the intermediary of the resistor, and

the bases of the two transistors are commonly connected to the output terminals of the pulse signals for controlling the switching devices, which are adjacent to the power source, of the logic circuit, while the end of the resistor adjacent to the ground is connected to the control input terminal of the switching device adjacent to the power source.

7. The pre-drive circuit for a brushless DC single-phase motor according to claim 2, wherein

the switching device drive circuit adjacent to the ground has a resistor and an NPN transistor and a PNP transistor that are connected in series in a forward direction through the intermediary of the resistor, and

the bases of the two transistors are commonly connected to the output terminals of the pulse signals for controlling the switching devices, which are adjacent to the ground, of the logic circuit, while the end of the resistor adjacent to the ground is connected to the control input terminal of the switching device adjacent to the ground.

8. The pre-drive circuit for a brushless DC single-phase motor according to claim 3, wherein

the switching device drive circuit adjacent to the ground has a resistor and an NPN transistor and a PNP transistor that are connected in series in a forward direction through the intermediary of the resistor, and

the bases of the two transistors are commonly connected to the output terminals of the pulse signals for controlling the switching devices, which are adjacent to the ground, of the logic circuit, while the end of the resistor adjacent to the ground is connected to the control input terminal of the switching device adjacent to the ground.

9. The pre-drive circuit for a brushless DC single-phase motor according to claim 2, further comprising:

an overvoltage protection circuit for restraining an overvoltage between the control input terminal of the switching device adjacent to the power source and the switching end, which is adjacent to a motor coil, of a pair of switching ends of the switching device.

10. The pre-drive circuit for a brushless DC single-phase motor according to claim 3, further comprising:

an overvoltage protection circuit for restraining an overvoltage between the control input terminal of the switching device adjacent to the power source and the switching end, which is adjacent to a motor coil, of a pair of switching ends of the switching device.

11. The pre-drive circuit for a brushless DC single-phase motor according to claim 4, further comprising:

an overvoltage protection circuit for restraining an overvoltage between the control input terminal of the switching device adjacent to the power source and the switching end, which is adjacent to a motor coil, of a pair of switching ends of the switching device.